

REMARKS

Claims 1-4 were presented for examination, of which claim 1 is independent. Applicants add new claims 6 and 7 herein. Support for the new claims can be found at least in Figure 6 and the accompanying description at page 11 of the present Application. Accordingly, no new matter is added.

After entry of this amendment, claims 1-4 and 6-7 will be pending, of which claim 1 is independent. Applicants respectfully submit that the pending claims are in condition for allowance, and respectfully request that the Examiner reconsider the outstanding rejections in view of the comments below.

I. Interview Summary

Applicants thank the Examiner for the courtesy of an interview on April 14, 2010. During the interview, Applicants discussed the present application with the Examiner, as well as the four references cited in the Office Action. Applicants noted that it appeared that one of ordinary skill in the art would not modify at least the Kondo reference in order to arrive at the mounting structure recited in the present claims, because Kondo teaches away from a fuel cell stack that is fixed to widthwise cross members. The Examiner indicated that this argument should be described in detail in the present Response. Accordingly, Applicants enumerate these arguments in §II, below.

Further, Applicants discussed the Examiner's remarks at pages 5-7 of the Office Action. Applicants thank the Examiner for indicating that it was not necessary to comment on these remarks in the present Response.

II. Rejection of Claims under 35 U.S.C. §103

Claims 1-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,378,637 to Ono et al. (hereafter "Ono") in view of U.S. Patent Publication No. 2003/0070858 to Kondo (hereafter "Kondo"), U.S. Patent No. 6,843,336 to Chernoff et al (hereafter "Chernoff") and U.S. Patent No. 5,460,234 to Matsuura et al (hereafter "Matsuura").

The present application is generally directed to a vehicle mounting structure for a fuel cell system. Conventionally, a fuel cell is disposed under the vehicle floor in an area defined by two longitudinal beams and two transverse beams of the vehicle frame forming a vehicle skeleton, and auxiliary components of the fuel cell are disposed under the vehicle floor in a region sandwiched by the two transverse beams and outside the region sandwiched by the two longitudinal beams. As a result, the auxiliary components are disposed outside of the region, defined by the vehicle frame, where the fuel cell is located. This requires more piping, increases the risk of transmission loss, and may expose the auxiliary components to damage in an accident.

Accordingly, the present application provides a vehicle mounting structure wherein the fuel cell unit and the auxiliary unit are each sandwiched from both sides in the longitudinal direction of the vehicle by two of the cross members.

The Examiner cites Ono for a vehicle having a fuel cell system with a fuel cell unit 3, an energy storage device 7, and an auxiliary unit 2/8. The energy storage device, fuel cell unit, and auxiliary unit are arranged in that order in the longitudinal direction of the vehicle, and are provided in the same area of the vehicle chassis. The Examiner recognizes that Ono does not provide cross members arranged in pairs and sandwiching the fuel cell unit, nor brackets attaching the fuel cell unit to the cross members.

The Examiner asserts that Kondo teaches a frame member 43 (i.e., cross member) extending in the width direction of the vehicle and provided in a position to protect the fuel cell 23/50 from damage in an impact. The Examiner also asserts that Kondo shows a plurality of cross members 43 sandwiching the fuel cell components.

However, Applicants respectfully submit that one of ordinary skill in the art would not modify the mounting structure shown in the Kondo reference in order to affix the fuel cell unit to the lateral cross-members using brackets, as described in the present application. For example, claim 1 recites:

*cross members provided in a width direction of the vehicle and connected to the pair of floor frames, and joined to the under side of the flat floor;
a first region defined by the pair of floor frames and a first pair of the cross members, the fuel cell unit being disposed so as to be close to the flat floor in the first region;*

a first pair of brackets sandwiching the fuel cell unit in the longitudinal direction of the vehicle, attached to bottom surfaces of the cross members, and attaching the fuel cell unit to the first pair of the cross members;

That is, width-wise cross members are provided, and a pair of the cross members define a first region. The fuel cell is disposed in the first region, and is mounted to the bottom surfaces of the (width-wise) cross-members. That is, because the fuel cell is mounted to the width-wise cross-members, the fuel cell is stationary in the longitudinal direction.

Kondo teaches that the fuel cell 23/50 is affixed to the longitudinal support frame members using a mount 45 including a slit 46 through which a bolt 47 is passed. The bolt 47 is allowed to move in the longitudinal direction so that the fuel cell is free to move in the longitudinal direction (Kondo at paragraph [0034]). Because the fuel cell can move in the longitudinal direction, all of the force during a sudden stop or vehicle collision is asserted in a direction parallel to the fuel cell plane and reduced due to the bolt 47 sliding through the slit 46 (Kondo at paragraph [0042]). A bumper 48 is provided to gently arrest the movement of the fuel cell before the fuel cell hits the width-wise cross member 43.

Accordingly, one of ordinary skill in the art would not modify the Kondo reference to achieve the structure recited in claim 1, because the claimed mounting structure fixes the fuel cell to the bottom surfaces of the cross members provided in a width direction of the vehicle. If one were to fix the fuel cell to the cross members of Kondo, the fuel cell would not be able to shift in the longitudinal direction during sudden stops and accidents, thus rendering Kondo's mounting structure unsatisfactory for its intended purpose.

Although the Examiner argues that Matsuura shows the battery casing attached to the widthwise cross members, Applicants respectfully submit that one of ordinary skill in the art would not modify Kondo in light of Matsuura, for the reasons described above.

In light of the foregoing amendments and arguments, Applicants respectfully submit that the Kondo, Ono, Chernoff and Matsuura references, alone or in any reasonable combination, do not teach or suggest each and every element of Applicants' amended claim 1. Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 1 under 35 U.S.C. §103(a).

Claims 2-4 depend from claim 1 and add separate and patentable limitations to claim 1. As such, for this and the reasons set forth above, Applicants respectfully submit that the dependent claims also define over the art of record.

Moreover, dependent claim 3 recites that a high voltage unit is provided, and is disposed in an area between the floor frames and the side sills. The Examiner recognizes that none of the references teach a high voltage unit between the floor frames and side sills (Office Action at page 5), but argues that Ono teaches that it is well known to locate “further components” exteriorly of the longitudinal frame members and interiorly to the peripheral sill. However, Ono does not teach that the high voltage unit specifically may be located in this area, and indeed specifically provides the high voltage unit at a different location.

More specifically, the present application notes that the high voltage system includes a current regulator 20 and the power control unit (PCU) 32. While Ono does not appear to mention a current regulator 20, Ono does teach that the PCU is located “above the motor ... in a motor room 11b closed by a bonnet 11a in the front portion of the automobile body.” Accordingly, Ono teaches a specific location for a “high voltage unit” like the one recited in the present claims, and there does not appear to be any reason given as to why one of ordinary skill would want to relocate the high voltage unit to the exterior of the frame.

III. New claims 6 and 7

Applicants add new dependent claims 6 and 7. Claims 6 and 7 depend from claim 1, and are therefore allowable for at least the same reasons as claim 1, discussed above.

Further, claim 6 recites that *at least a portion of the flange is provided between the fuel cell and the under cover*. Such an arrangement can be seen, for example, in Figure 6. The Examiner cites Matsuura for a flange member (Office Action at page 4), specifically citing “portions 74.” However these portions, which Matsuura identifies as “hangar members,” appear to exist solely outside of the undercover (which the Examiner identifies as elements 72, 73; see Office Action at page 4; *see also* Matsuura at Figure 10). Accordingly, the identified flange members are not provided between the fuel cell (which the Examiner identifies as the batteries B) and the undercover, as recited in claim 6.

New claim 7 recites that *at least one of the cross members has a U shape when viewed in cross-section*. Because the cross members of the present application have a U-shape when

viewed in cross-section, it is simpler to mount the fuel cell to the bottom of the cross-members, as shown in Figure 6. In the cited references, the cross-members do not appear to be U-shaped in cross-section; indeed, it appears that one of ordinary skill in the art would not modify the references to provide U-shaped cross members. In Kondo, the cross members 43 are meant to absorb the impact of a collision and deflect deformed members away from the fuel cell. This purpose is made more difficult if the cross-members are made U-shaped in cross section, rather than completely solid.

Additionally, Matsuura teaches that the body frame is constructed of a steel pipe; although the frame members are referred to as “U-shaped,” this appears to refer to the bending of the pipe, and not the member’s cross section.

In view of the above, Applicants respectfully submit that claims 6 and 7 recite further patentable subject matter, and respectfully request that the Examiner pass claims 6 and 7 to allowance.

CONCLUSION

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

Please charge any shortage or credit any overpayment of fees to our Deposit Account No. 12-0080, under Order No. SIW-103USRCE. In the event that a petition for an extension of time is required to be submitted herewith, and the requisite petition does not accompany this response, the undersigned hereby petitions under 37 C.F.R. § 1.136(a) for an extension of time for as many months as are required to render this submission timely. Any fee due is authorized to be charged to the aforementioned Deposit Account.

Dated: April 26, 2010

Respectfully submitted,

Electronic signature: /Anthony A. Laurentano/
Anthony A. Laurentano
Registration No.: 38,220
LAHIVE & COCKFIELD, LLP
One Post Office Square
Boston, Massachusetts 02109-2127
(617) 227-7400
(617) 742-4214 (Fax)
Attorney/Agent For Applicant